

Identical Twins Study ^[1]

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The identical twins study has been used for a long time, to study the effects of environment and genetics on human development.

Some studies have tried to determine how genetics and environmental factors contribute to intelligence, aggression or substance addictions.

Most of the twin's studies compare identical twins, having 100% genetic similarity, with non identical twins, with about 50% genetic similarity. The researcher compares the occurrence of an individual trait between identical and fraternal twins. If the identical twins show more similarity for this trait than the non-identical twins, then the excess is assumed to be down to genetic factors.

This type of analysis would then allow the researchers to estimate the heritability of specific traits and quantify the effect of genetic factors on the individual trait. Psychologists have long known that a twin study is not a true experimental design, but it has led to some interesting insights into the influence of genes on human behavior.

For this method, a number of assumptions have to be made; that the identical twins share identical DNA profiles, and that the environmental factors are the same for all participants.

Criticisms

There have been few criticisms of identical twin studies over the years. By their nature, and because of small sample sizes, it is very difficult to quantitatively ^[3] analyze the results and so all experimentation tends to be observational ^[4]; the sample groups cannot be random so statistical analysis is impossible.

The experimental methods assume that there is little difference in the environmental factors between fraternal and identical twins, but there is a criticism that the tendency of adults to treat identical twins in exactly the same way makes this assumption invalid. Parents tend to dress identical twins the same way and encourage them to pursue the same interests.

The distinction between environmental factors and genetic influences may not be as black and white as the identical twins study assumes. There is probably an interaction between genes and environment and so the whole picture may be a lot more complex.

In addition, the experiment [5] tends to assume that one gene affects one behavioral trait. Modern genetic research is showing that many different genes can influence behavior.

Summary

The above criticisms all have some validity [6], but the main point is that twin studies have never claimed to be anything other than observational, identifying and trying to explain trends rather than prove a hypothesis [7].

Whilst there are some concerns about the validity of the identical twins study, such experiments are certainly better than performing no research at all.

Twin studies are now trying to analyze the environmental factors more. Instead of assuming that the environmental factors are the same, they are now contrasting shared family environment with the individual events suffered by the individual twin.

In addition, identical twins study [8] is constantly evolving into more complex forms, now taking into account whole families and other siblings in addition to the twins.

Research into the human genome is now resurrecting the studies of twins; hereditary trends observed in an identical twins study can now be studied quantitatively in the laboratory. It is now standard practice, when conducting twin's research to analyze DNA from all participants and this is bypassing many of the concerns about the twin study.

Bibliography

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[4] <https://staging.explorables.com/observational-study>

[5] <https://staging.explorables.com/conducting-an-experiment>

[6] <https://staging.explorables.com/validity-and-reliability>

[7] <https://staging.explorables.com/research-hypothesis>

[8] http://en.wikipedia.org/wiki/Twin_studies